

CLAIMS

We claim:

1. A three-dimensional structure applicable to heart, comprising a cell derived from a part other than myocardium of an adult.
2. A structure according to claim 1, wherein the cell is a stem cell or a differentiated cell.
3. A structure according to claim 1, wherein the cell is a mesenchymal cell.
4. A structure according to claim 1, wherein the cell is derived from a myoblast.
5. A structure according to claim 4, wherein the myoblast is a skeletal myoblast..
6. A structure according to claim 1, wherein the cell is a fibroblast.
7. A structure according to claim 1, wherein the cell is a synovial cell.
8. A structure according to claim 1, wherein the cell is derived from a stem cell.
9. A structure according to claim 1, wherein the cell is derived from a subject, the structure being applied to the subject.
10. A structure according to claim 1, wherein the cell is not derived from a subject, the structure being applied to the subject.
11. A structure according to claim 1, wherein the structure expresses at least one non-adult heart marker selected from the group consisting of myosin heavy chain IIa, myosin heavy chain IIb, myosin heavy chain IIc(IIx), CD56, MyoD, Myf5, and myogenin.
12. A structure according to claim 11, wherein an expression level of the non-adult heart marker in the structure is at least 50% of an expression level of the non-adult heart marker in skeletal myoblasts.

13. A structure according to claim 1, wherein the three-dimensional structure expresses all of myosin heavy chain IIa, myosin heavy chain IIb, myosin heavy chain IIc(IIX), CD56, MyoD, Myf5, and myogenin.
14. A structure according to claim 13, wherein an expression level of each of myosin heavy chain IIa, myosin heavy chain IIb, myosin heavy chain IIc(IIX), CD56, MyoD, Myf5, and myogenin in the structure is at least about 50% of an expression level thereof in skeletal myoblasts.
15. A structure according to claim 13, wherein an expression level of each of myosin heavy chain IIa, myosin heavy chain IIb, myosin heavy chain IIc(IIX), CD56, MyoD, Myf5, and myogenin in the structure is at least about 100% of an expression level thereof in skeletal myoblasts.
16. A structure according to claim 1, wherein the cell derived from a part other than myocardium is a cell not derived from heart.
17. A structure according to claim 1, wherein the applicability to heart includes applicability to myocardium.
18. A structure according to claim 1, comprising a monolayer cell sheet.
19. A structure according to claim 1, comprising a multilayer cell sheet.
20. A structure according to claim 19, wherein the multilayer cell sheet has biological connection.
21. A structure according to claim 20, wherein the biological connection is selected from the group consisting of connection via extracellular matrix, electrical connection, and connection without scaffold.
22. A medicament, comprising a three-dimensional structure according to any one of claims 1 to 21.
23. A medicament according to claim 22, wherein the heart has a disease or disorder selected from the group consisting of heart failure, ischemic heart disease, myocardial infarct, cardiomyopathy, myocarditis, hypertrophic cardiomyopathy, dilated phase hypertrophic cardiomyopathy, and dilated cardiomyopathy.

24. A method for producing a three-dimensional structure applicable to heart comprising a cell derived from a part other than myocardium of an adult, the method comprising the steps of:

a) culturing the cell derived from the part other than myocardium of an adult on a cell culture support grafted with a temperature responsive macromolecule having an upper limit critical solution temperature or lower limit critical solution temperature to water of from 0°C to 80°C;

b) setting a culture medium temperature to the upper limit critical solution temperature or more or the lower limit critical solution temperature or less; and

c) detaching the cultured cell as a three-dimensional structure.

25. A method according to claim 24, wherein a treatment using a protein degrading enzyme is not performed in or before the detaching step.

26. A method according to claim 24, wherein the temperature responsive macromolecule is poly(N-isopropylacrylamide).